

The opinion in support of the decision being entered today was **not** written for publication in a law journal and is **not** binding precedent of the Board.

Paper No. 29

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte DALE M. BROWN, GERALD J. MICHON,  
VIKRAM B. KRISHNAMURTHY  
and JAMES W. KRETCHMER

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Appeal No. 1997-3441  
Application No. 08/614,920

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ON BRIEF

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Before THOMAS, BARRETT, and RUGGIERO, Administrative Patent Judges.

RUGGIERO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1-15, 29, and 31, all of the claims pending in the application. Claims 16-28, 30, and 32 have been canceled.

The claimed invention relates to a silicon carbide (SiC) integrated circuit which includes a depletion mode MOSFET and resistor. The integrated circuit includes first and second SiC layers doped to first and second conductivity types,

respectively, with the second SiC layer including at least four more heavily doped ion-implanted regions. Two of the more heavily doped regions comprise MOSFET electrodes and two others comprise resistors.

Claim 1 is illustrative of the invention and reads as follows:

1. A silicon carbide (SiC) integrated circuit (IC) including a depletion mode MOSFET and a resistor, comprising:

a first layer comprising SiC material doped to a first conductivity type, the first conductivity type being p type conductivity;

a second layer overlaid on the first SiC layer and comprising SiC material doped to a second conductivity type, the second conductivity type being n type conductivity, the second SiC layer including at least four more heavily doped ion-implanted regions of said second conductivity type, two of said more heavily doped regions comprising MOSFET electrodes and two others of said more heavily doped regions comprising resistor electrodes, said second SiC layer including an isolation region between said MOSFET electrodes and said resistor electrodes;

an oxide layer situated over said second SiC layer, at least a portion of said oxide layer being positioned over a portion of said second SiC layer between said MOSFET electrodes, one of said MOSFET electrodes comprising a source electrode and the other of said MOSFET electrodes comprising a drain electrode;

a MOSFET gate electrode positioned over said portion of said oxide layer between said MOSFET source and drain electrodes and comprising an electrically conductive material; and

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coupling means for forming electrically conductive source, drain, and resistor electrode contacts over said source, drain, and resistor electrodes respectively, and for electrically coupling one of said source electrode contact, said drain electrode contact, and said gate electrode to one of said resistor electrode contacts.

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The Examiner relies on the following prior art:

Kurtz et al. (Kurtz)	5,165,283	Nov. 24,
1992		
Takasu	5,326,991	Jul. 05,
1994		

(Filed Dec. 10, 1991)

Fang et al. (Fang) <sup>1</sup>	2,756,915	Jul.
08, 1978		
(German Patent Publication)		

Ito (Japanese Kokai) <sup>1</sup>	2-7474	Jan. 11,
1990		

Adel S. Sedra et al. (Sedra), "Appendix A" in Microelectronic Circuits, 796 (Holt, Rinehart and Winston, 1982).

Claims 1-15 and 31 stand finally rejected as being based on an inadequate disclosure under the first paragraph of 35 U.S.C. § 112. Claims 1-15, 29, and 31 stand finally rejected under 35 U.S.C.

§ 103 as being unpatentable over Ito, Fang, Sedra, Takasu, and Kurtz, all considered together.

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<sup>1</sup> Copies of the translations of the Fang and Ito references provided by the U.S. Patent & Trademark Office, December 1999, are included and relied upon for this decision.

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Rather than reiterate the arguments of Appellants and the Examiner, reference is made to the Briefs<sup>2</sup> and Answers for the respective details thereof.

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<sup>2</sup> The Appeal Brief was filed March 3, 1997. In response to the Examiner's Answer dated April 21, 1997, a Reply Brief was filed June 9, 1997 which was acknowledged and entered by the Examiner without further comment on July 1, 1997.

OPINION

We have carefully considered the subject matter on appeal, the rejections advanced by the Examiner, the arguments in support of the rejections and the evidence of obviousness relied upon by the Examiner as support for the obviousness rejection. We have, likewise, reviewed and taken into consideration, in reaching our decision, Appellants' arguments set forth in the Briefs along with the Examiner's rationale in support of the rejections and arguments in rebuttal set forth in the Examiner's Answer.

It is our view, after consideration of the record before us, that Appellants' specification in this application describes the claimed invention in a manner which complies with the requirements of 35 U.S.C. § 112. We are also of the view that the evidence relied upon and the level of skill in the particular art would not have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in claims 1-15, 29, and 31. Accordingly, we reverse.

With respect to the 35 U.S.C. § 112, first paragraph, rejection, we note that, although the Examiner relies on both the "written description" and "enablement" requirements of the

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statute, the Examiner's arguments are limited to Appellants' alleged failure to provide an enabling disclosure.<sup>3</sup>

Accordingly, we will direct our discussion to the merits of the Examiner's position as to the enabling nature of Appellants' disclosure. We point out, however, that our review of Appellants' specification and drawing figures which describe the claimed silicon carbide (SiC) integrated circuit unquestionably reveals compliance with the statutory "written description" requirement, i.e. Appellants were clearly in possession of the invention at the time of filing of the application.

As to the Examiner's rejection of the appealed claims for "lack of enablement", we note that, in order to comply with the enablement provision of 35 U.S.C. § 112, first paragraph, the disclosure must adequately describe the claimed invention so that the artisan could practice it without undue experimentation.

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<sup>3</sup> Our reviewing court has made it clear that written description and enablement are separate requirements under the first paragraph of 35 U.S.C. § 112. Vas-Cath Inc. v. Mahurkar, 935 F.2d 1555, 1560, 19 USPQ2d 1111, 1114 (Fed. Cir. 1991). The terminology "lack of support" has also been held to imply a reliance on the written description requirement of the statute. In re Higbee and Jasper, 527 F.2d 1405, 1406 188 USPQ 488, 489 (CCPA 1976).

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In re Scarbrough, 500 F.2d 560, 566, 182 USPQ 298, 303 (CCPA 1974); In re Brandstadter, 484 F.2d 1395, 1404, 179 USPQ 286, 293 (CCPA 1973); and In re Gay, 309 F.2d 769, 774, 135 USPQ 311, 316 (CCPA 1962). If the Examiner has a reasonable basis for questioning the sufficiency of the disclosure, the burden shifts to Appellant to come forward with evidence to rebut this challenge. In re Doyle, 482 F.2d 1385, 1392, 179 USPQ 227, 232 (CCPA 1973), cert. denied, 416 U.S. 935 (1974); In re Brown, 477 F.2d 946, 950, 177 USPQ 691, 694 (CCPA 1973); and In re Ghiron, 442 F.2d 985, 992, 169 USPQ 723, 728 (CCPA 1971). However, the burden is initially upon the Examiner to establish a reasonable basis for questioning the adequacy of the disclosure. In re Strahilevitz, 668 F.2d 1229, 1232, 212 USPQ 561, 563 (CCPA 1982); In re Angstadt, 537 F.2d 498, 504, 190 USPQ 214, 219 (CCPA 1976); and In re Armbruster, 512 F.2d 676, 677, 185 USPQ 152, 153 (CCPA 1975).

The Examiner has questioned (Answer, pages 3 and 6) the sufficiency of Appellants' disclosure in describing the various fabricating steps for producing the claimed silicon carbide (SiC) integrated circuit. In the Examiner's view, although all



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of Appellants' described fabricating steps are standard processing steps in silicon-based technology, there is no enabling disclosure for implementation of these processing steps using silicon carbide (SiC) material.

After careful review of the arguments of record, however, we are in agreement with Appellants' position as stated in the Briefs. As pointed out by Appellants (Brief, pages 6 and 7), the specification describes the details of the fabrication of the first and second SiC layers (pages 4 and 10), the production of the heavily doped ion-implantation regions of the same conductivity type as the second SiC layer to form the claimed MOSFET and resistor electrodes (pages 5 and 6), as well as the tailoring of the resistor values to accommodate the temperature coefficient characteristics of SiC material (page 10). To further buttress Appellants' contention as to the enabling nature of the disclosure, we point to the Kurtz and Takasu references, cited by the Examiner as part of the obviousness rejection, as further evidence that skilled artisans were able to fabricate integrated circuits of SiC material at the time of filing of Appellants' application. In our view, the present disclosure is of sufficient detail so as to enable one of

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ordinary skill to implement an operative embodiment of the claimed invention.

In view of the above, we find that the Examiner has not established a reasonable basis for challenging the sufficiency of the instant disclosure. Accordingly, we will not sustain the rejection of claims 1-15 and 31 under the first paragraph of 35 U.S.C. § 112.

We will also not sustain the rejection of claims 1-15, 29, and 31 under 35 U.S.C. § 103. The Examiner has failed to set forth a prima facie case of obviousness. In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the Examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (CCPA 1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge

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generally available to one having ordinary skill in the art.  
Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051,  
5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825  
(1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.,  
776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert.  
denied, 475 U.S. 1017 (1986); ACS Hosp. Sys., Inc. v. Montefiore  
Hosp.,  
732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These  
showings by the Examiner are an essential part of complying with  
the burden of presenting a prima facie case of obviousness.  
Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444  
(Fed. Cir. 1992).

With respect to independent claims 1, 10, and 29, the  
Examiner as the basis for the obviousness rejection, proposes to  
combine Ito, Fang, and Sedra to address the claimed integrated  
MOSFET and resistor structure. Takasu and Kurtz are added to  
the combination to address the silicon carbide (SiC) material  
limitations.

In response, Appellants assert a lack of suggestion or  
motivation in the references for combining or modifying  
teachings to establish a prima facie case of obviousness. After

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careful review of the applied prior art references, we are in agreement with Appellants' stated position in the Briefs. The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. In re Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992). The Examiner's statement of the grounds of rejection at page 4 of the Answer is lacking in any rationale as to why the skilled artisan would have combined the integrated circuit features of Ito, Fang, and Sedra, as well as any motivating reason for adding the SiC teachings of Kurtz and Takasu to this combination. Rather than pointing to specific information in the references that would have suggested their combination with each other, the Examiner instead has described the isolated similarities between the references and the claimed invention. Nowhere does the Examiner identify any suggestion, teaching, or motivation to combine the references nor does the Examiner establish any findings as to the level of ordinary skill in the art, the nature of the problem to be solved, or any other factual findings that would support a proper obviousness analysis. See, e.g., Pro-Mold & Tool Co. v. Great Lakes

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Plastics, Inc., 75 F.3d 1568, 1571, 37 USPQ2d 1626, 1629 (Fed. Cir. 1996). We are left to speculate why one of ordinary skill would have found it obvious to combine the FET and resistor features of Ito, Fang, and Sedra and the SiC material teachings of Kurtz and Takasu. The only reason we can discern is improper hindsight reconstruction of Appellants' claimed invention. In order for us to sustain the Examiner's rejection under 35 U.S.C. § 103, we would need to resort to speculation or unfounded assumptions or rationales to supply deficiencies in the factual basis of the rejection before us. In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968), rehearing denied, 390 U.S. 1000 (1968).

We further agree with Appellants (Brief, page 14) that, even assuming arguendo that proper motivation were established for the Examiner's proposed combination, the resulting structure would fall well short of meeting the specific requirements of the claims on appeal. As pointed out by Appellants, each of the independent claims 1, 10, and 29, require a MOSFET electrode structure having heavily doped ion-implanted regions situated in a SiC layer of the same conductivity type. Although Sedra discloses a resistor structure with n+ regions in an n type

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well, none of the references have any suggestion of implementing a MOSFET in a same conductivity type well. The Examiner has provided no indication as to how and where the skilled artisan might have found it obvious to modify the teachings of the applied prior art to arrive at the claimed invention.

Accordingly, since the Examiner has failed to establish a prima facie case of obviousness, we do not sustain the 35 U.S.C. § 103 rejection of independent claims 1, 10, and 29, nor of claims 2-9, 11-15, and 31 dependent thereon.

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In conclusion, we have not sustained either of the Examiner's rejections of the claims on appeal. Accordingly, the Examiner's decision to reject claims 1-15, 29, and 31 is reversed.

REVERSED

JAMES D. THOMAS	)	
Administrative Patent Judge	)	
	)	
	)	
	)	
	)	BOARD OF PATENT
LEE E. BARRETT	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
	)	
	)	
	)	
JOSEPH F. RUGGIERO	)	
Administrative Patent Judge	)	

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